IN THE SPECIFICATION

Please replace the paragraph starting on page 6, line 1, with the following replacement paragraph.

Sub B17

A1

The present invention is a multi-layer contact that consists of multiple material layers providing high reflectivity, low specific contact resistance, and high reliability. Figure 1 shows a cross-sectional embodiment of a semiconductor device 10 with a multi-layer contact 12. The multi-layer contact 12 includes an ohmic layer 12A and a reflective layer 12B. In combination, the ohmic and reflective layers 12A, 12B form a highly reflective ohmic electrical contact to semiconductor structure 11. Various optoelectronic semiconductor structures 11 can be used with the multi-layer reflective contact layers 12.

Please replace the paragraph starting on page 7, line 27 with the following replacement paragraph.

A2

Reflective layer 12B is selected from a group that includes Al, Cu, Rh, Au, Pd, and Ag, alone and any combination. Ag is used in special cases because of electro-migration issues. Al does not electro-migrate as severely as Ag and therefore can be used more reliably in reflective multi-layer contacts. Using Al as the reflector, the maximum ohmic layer thickness in the visible region is 150Å for Rh, 200Å for Cu, and 100Å for Au in order to achieve a reflectivity of greater than 75%. Ohmic contact metals that are more absorbing need to be less than 100 Å in the visible spectrum. The reflector layer is greater than 500Å thick so that no light will pass through;

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Cont. A2

thus maximum reflectivity is achieved. This layer not only acts as the light reflector but it also will do most of the lateral current spreading, because of the thickness. This is beneficial because the ohmic layer 12A is typically too thin to spread current effectively on its own. Current spreading by a thick reflector layer (>500Å) in optoelectronic devices, has many benefits including low V_f (lower spreading resistance). Also, the reflector layer connects any discontinuity in the multi-layer contact created by the surface roughness of the semiconductor structure surface.

Please replace the paragraph starting on page 8, line 23, with the following replacement paragraph.

A3

Figure 4 illustrates an alternate embodiment of the multi-layer contact 22 to a semiconductor device 20 with multiple contact layers 22A, 22B, and 22C. Ohmic layer 22A provides ohmic contact to semiconductor 21. A barrier metal layer 22B interposes the ohmic 22A and reflector layers 22C. The barrier layer 22B is used to prevent diffusion of the ohmic layer 22A into the reflector layer 22C, thus preventing the creation of any inter-metallics. These inter-metallics could degrade the specific contact resistance and reflectivity of the contact and thus the efficiency of the device. This is a reliability issue that should be avoided for long lasting devices. The barrier metal layer should be kept thin, e.g. < 100Å, to minimize light absorption and should be as reflective as possible to contribute to the reflectivity of the contact. Exact metals will vary depending on the ohmic layer 22A and the reflector layer 22C but some candidates include Ni, Co, NiO, Rh, Cr, Pt, Mo, Ti, TiW, WSi, WSi:N, TaSi, TaSi:N, InSnO or TiW:N. The ohmic 22A and

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cont. A3

reflector 22 C layers provide the same function as described in the first embodiment.

Please replace the paragraph starting on page 9, line 12 with the following replacement paragraph.

A4

Figure 5 shows a vertical current LED structure. The multi-layer contact is located on the bottom-side of a LED device 30 that has a conductive substrate 35 so that contacts can be placed on opposing sides of the device creating vertical current (perpendicular to the contacts) paths. A top contact 31 is either a small area contact or a thin full sheet (not shown) to minimize absorption. The top contact 31 is the electrical contact layer to the n or p-type semiconductor layer(s) 32 of the LED. An active light producing region 33 interposes the top and bottom n or p-type semiconductor layer(s) 32, 34. Either of the multi-layer contacts shown in Figure 1 or 4 may be used with an ohmic contact layer 36, a reflector layer 38, and a barrier layer (for the alternative embodiment) 37.

Please replace the paragraph starting on page 10, line 1 with the following replacement paragraph.

A5

An alternate configuration for an LED device 40 with multi-layer contacts is shown in Figure 6. The contacts are attached on the same side of the device because substrate 41 is non-conductive to create a device that relies on lateral current (parallel to the contacts) to operate. This is made possible by exposing the lower conducting n or p-type layer 42 by etching. The active light-producing region 43 interposes the top and bottom n or p-type layer(s)

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